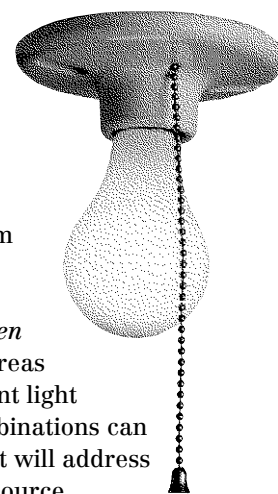


OCTOBER 1997

ENERGY EFFICIENT INDOOR LIGHTING

Compared to homes built a decade ago, American homes of today now feature improved technologies and construction techniques. They are also equipped with far more efficient appliances, making new homes easier to maintain and less costly to operate. There is an area, however, where homes are not keeping up with the times. This area is lighting. Americans light their homes today with virtually the same technology their grandparents used: the heated filaments of incandescent bulbs.

Residential lighting consumes about 140 billion kWh of electricity per year, at an approximate cost to consumers of \$11 billion.



A recent EPA report estimates that residential lighting consumes about 140 billion kWh of electricity per year, at an approximate cost to consumers of \$11 billion. If every US home was equipped with better and more efficient lighting, these energy costs could be reduced by at least one third. Moreover, this reduction could happen without the total replacement of fixtures (or *luminaires*) in a home. Reduced energy consumption not only reduces home ownership costs, it also helps reduce the environmental impact associated with energy consumption. For example, if all households could reduce their lighting energy consumption by 1/3, the direct result would be the equivalent of 6.5 million cars' tailpipe exhaust

being removed from the road.

This *Choose Green Report* will cover areas where more efficient light source/fixture combinations can be used. The report will address the basics of light source characteristics and "adequate" levels of lighting, offer some lighting tips, provide a set of selection criteria and recommend a number of available products. This report's primary focus is on fixed luminaires, or fixtures that are installed in homes by builders, rather than portable luminaires (such as floor or table lamps) — which would be installed by

Continued on page 2

Continued from page 1

occupants. While efficient lighting is not often specified by buyers, by equipping or providing a home with more efficient lighting options, builders can help owners further reduce the costs of operating a house, as well as providing it with more selling features. Combined with savings from other areas such as HVAC (Heating, Ventilation and Air Conditioning), these savings can even make it possible for owners to afford a higher monthly mortgage payment.

Luminaire Basics

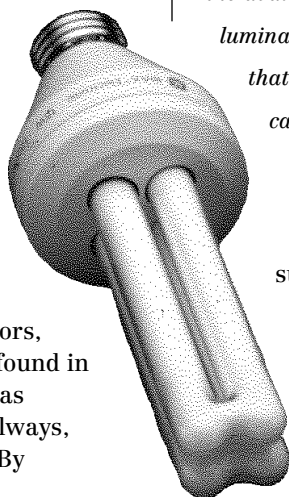
Some utilities have found that approximately 25% of the luminaires in a home account for about 80% of the household lighting energy use. Indoors, these luminaires can be found in frequent-use areas such as bathrooms, kitchens, hallways, work areas and studies. By

identifying these luminaires and replacing them with luminaires containing more efficient light

Compact fluorescent lightbulbs (CFLs) are gaining popularity in

American homes, but their usage is limited by the available luminaires

that they can fit into.



sources (mainly fluorescent, compact fluorescent (CFLs), and low-voltage halogen sources), savings can be achieved without significantly changing the “look” of a new home or the builder’s lighting budget. In fact, a recent Lighting Research Center report suggested that consumers prefer well-designed energy-efficient sources over conventional lighting.

Substantial progress has been made in developing better, energy efficient light bulbs. CFLs are also gaining some popularity in American homes, but their usage is limited by the available luminaires that they can fit into. This “ill-fit” is partly due to the lack of attention for the improvement of the residential light bulb/light fixture combination.

Some dedicated fluorescent luminaires are being used in homes nevertheless: approximately 85% of luminaires installed in homes are incandescent and 15% are fluorescent. The majority of these fluorescent fixtures, however,

provide poor light quality and are equipped with low-cost ballasts that emit as much noise as they do light, thus perpetuating fluorescents’ poor image. The highly efficient, high technology components widely available in commercial luminaires are still relatively uncommon in residential applications.

Effective, Efficient Lighting

Different areas of the home demand different kinds of lighting. Here, we focus on high-use areas that can benefit from reliable, efficient lighting. Such areas include kitchens, bathrooms and hallways.

To be effective, good lighting should not stand out. Instead it should make the occupants comfortable, and indicate areas for work or play without drawing attention to the lighting itself. Bad lighting, on the other hand, stands out. Therefore, wholesale changes in lighting fixtures are a risky proposition, unless requested by owners and assisted by a designer.

We suggest that the switch to efficient fixtures begins with the highest use fixtures. Determine the easiest conversions and start with those. As buyers become more accustomed to higher quality lighting, then different “upgrade packages” can be offered to them — from a basic package to a more specialized, custom design package. Some possible efficient upgrades or alternatives for high-use areas are discussed on pages 4-5.

The **Choose Green Report** is published monthly for Green Seal Environmental Partners. To become an Environmental Partner, or to receive a copy of this report, contact Green Seal at (202) 588-8400 x 21 or lcarr@greenseal.org.

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LIGHTING CONCEPTS AND TERMINOLOGIES

Below are some concepts and terminologies that can help in determining the suitability and efficacy of a light source and/or luminaire. These terms are only a limited subset of lighting terminology.

LUMINAIRE — This report uses this term interchangeably with “fixture” or “lighting fixture”. These terms refer specifically to a hard-wired, fixed-position apparatus that houses a light source and associated components, whose purpose is to provide illumination in a decorative or prescribed manner. These include, but are not limited to, downlights, sconces, vanity, etc. Reading, table and floor lamps are generally referred to as “portable fixtures.”

LIGHT SOURCES — The light sources that we deal with in this report are incandescent, halogen and fluorescent.

incandescent: this is the most common light source that most of us have in our homes, whose design is based on the concept of heating a tungsten filament to produce light. Its technology has not significantly changed since its invention in the late 1800s. These light sources have good color rendition and are inexpensive to make and buy. Unfortunately, they are not very efficient in converting electric energy into light (about 80-90% of the energy consumed is released as heat). They also do not last very long, averaging less than 1000 hours.

halogen: halogen lights are also incandescent sources. The heated filament concept was improved by encasing the filaments in halogen-filled quartz capsules. Halogen gas makes the light burn brighter and also helps the filament last longer. These sources have good color rendition and are somewhat more efficient at converting energy into light (low-voltage halogen are more

efficient than the typical, double-ended 300 W halogen that you find on your grocer’s shelves).

fluorescent: fluorescent sources do not use filaments. Instead they use a high voltage arc between their terminals to excite the gas they contain. The gas interacts with the bulb’s phosphor coating which results in light. Fluorescent sources are typically 3 to 5 times more efficient than incandescent sources. Unfortunately, the typical linear fluorescent bulbs found in shop lights and other low-quality fixtures usually have poor starting characteristics and cannot reproduce color accurately. However, the new generation of fluorescent bulbs, both compact and linear, can match their incandescent counterparts in color rendering, can start without flicker and can last from 8,000 to 18,000 hours.

BALLASTS — The operation of light sources such as fluorescent or low voltage halogen lamps requires a ballast to control the voltage needed. Most current residential ballasts are magnetic, which can be noisy and not as efficient as electronic or hybrid ballasts. These latter type ballasts can be found in better-quality luminaires. Electronic ballasts also permit additional fine tuning of controls, such as more rapid, flicker-free starts and dimming characteristics.

BRIGHTNESS — This term refers to the intensity of light striking a surface. Brightness is measured in footcandles. One footcandle is equal to the light of 1 standard candle striking 1 square foot of surface located 1 foot away.

LIGHT QUANTITY — This measurement is taken directly at the light source and is a calculation of the flow of light. It refers to the light energy or quantity of light emitted by any light source and is measured in lumens. The brighter the light source, the higher its lumen measurement. A typical, 60W, incandescent bulb will have a lumen value of approximately 700-800 lumens.

LIGHT LEVELS — Experts agree that there is no single correct way to light a room, nor is there an optimum light level for every situation. Instead, light levels are dependent on what the light is being used for. Suggested light levels for different tasks are generally divided into 3 levels:

dim (4 to 7 footcandles): this level of light is approximately equal to the ambient lighting needed for living rooms or hallways.

medium (8 to 20 footcandles): many indoor environments are lit at this level, which is sufficient to perform general activities that do not require detailed viewing for extended amounts of time. These activities include casual reading or dining.

bright (20 footcandles and above): anything above 20 to 25 footcandles is considered bright. For example, a small reading lamp can cast about 50 footcandles, which is also sufficient for food preparation and other close-up activities.

Continued on page 4

LIGHTING CONCEPTS AND TERMINOLOGIES

Continued from page 3

EFFICACY — Efficacy describes the light source's ability to convert electric energy into light. It is measured in lumens per watt (lpw). The higher the lpw, the more efficient a light source. Conventional incandescent sources put out about 10 to 15 lpw, while the more efficient fluorescent sources can put out about 50 to 75 lumens per watt. Note that efficacies can be measured for lamps (bulbs) as well as lamp/fixture combination (system efficacy).

COLOR RENDITION — Color rendition describes our perception of the way in which light affects a color. In other words, it is the effect of a particular light source on the appearance of a colored surface or object. A light source's ability

to illuminate true colors is measured by its color rendering index (CRI), which ranges from 1 to 100. A CRI of 80 or above means that the light source can reproduce colors accurately. Most industrial fluorescent sources (work lights, for example) have CRI in the 50 range, while most high-quality fluorescents have a CRI of 75 or better.

TYPES OF LIGHTING — Lighting can be separated into three distinct categories: general, task and accent. Their distinguishing characteristics are described below. For the purpose of this report, we focus only on the first two, general and task.

general (or ambient): this type of lighting fills a space with overall illumination. Its main purpose is to allow the occupant to see and move around. Luminaires such

as wall sconces, uplights and table/floor lamps are used for this purpose.

task: this type of lighting permits intensive visual activities without eye discomfort. It generally involves the bright illumination of a small area. Luminaires such as recessed downlights, track, table, work or floor lamps are used for this purpose.

accent: this type of lighting is used for decorative purposes: to set a mood, add drama, or highlight some features of a space. Lighting of this type is primarily directional in nature and utilizes track, recessed, or spot-type luminaires.

LAMP SIZE — Fluorescent bulbs are categorized by their cross-section (diameter) size in 1/8 inch increments, for example, a "T-8" lamp is 1 in. in diameter, while a "T-12" is 1.5 in.

Upgrades and Examples

► **KITCHENS** — Kitchens are high traffic areas, and often require two levels of light. Because they are used as congregation areas as well as task areas, both ambient and task lighting are needed. Ambient lighting needs can be met by one or more high-efficacy, low noise, linear fluorescent fixtures or a multi-lamp compact fluorescent pendant. Task lighting can be met using CFL downlights, CFL or low voltage halogen track lights, or under cabinet light strips. A popular solution to the task lighting has been the use of magnetically-ballasted fluorescent strips hidden under the cabinets. While these can provide the brightness needed for a number of tasks, they can become a strong

source of glare if they are improperly mounted. Coupled with low-quality bulbs, the glare and noise can actually discourage their use rather than promote it.

Example 1: Energy Savings with High Quality, Linear Fluorescents in the Kitchen.

Often, kitchens are lit overhead using recessed downlight fixtures (known as "cans"). These require

from 6 to 10 fixtures, depending on the size of the kitchen area. Because cans are recessed, they only give off "cones" of light. Therefore, they are typically placed close together so that these "cones" of light overlap, and even-illumination is achieved. Using so many fixtures is excessive. These 6-10 fixtures may be replaced by just 1 or 2 linear fluorescent fixtures (which are not recessed) with electronic ballasts and T8

EXAMPLE 1: Kitchens

LAMP TYPE	QUANTITY	TOTAL WATT	AV. LUMENS	EFFICACY (lpw)	ENERGY (Cost/Yr)
Incandescent cans	10 x 100 W	1000	15,000	15	\$218.40
Linear fluorescent	4 x 40 W	160	12,800	80	\$34.85

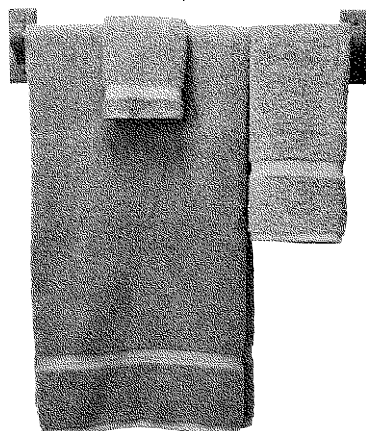
lamps. The savings are estimated in the table on page 4. Note that other advantages of switching to fluorescents include more even lighting (downlights can cast uneven light patterns if improperly spaced), and fewer bulb replacements. The cost calculations are based on \$0.10 per kWh and 6 hours use per day.

► **BATHROOMS** — While a central overhead fixture can provide the overall lighting in many bathrooms, the key to good bathroom illumination is even, shadowless task lighting. This is easily accomplished with a high CRI linear fluorescent fixture over the top of the mirror, or two similar fixtures along the sides. These can provide excellent task lighting for shaving, grooming, and applying makeup.

Example 2: Energy Savings with High Quality CFL or Linear Fluorescents in Bathrooms.

High-use areas in the home — like kitchens, bathrooms, and hallways — can benefit from reliable, efficient lighting.

Lighting for bath vanities or mirrors is often provided by a “lighting strip” consisting of 5, 6, or 10 equally spaced incandescent bulbs.



EXAMPLE 2: Bathrooms

LAMP TYPE	QUANTITY	TOTAL WATT	AV. LUMENS	EFFICACY (lpw)	ENERGY (Cost/Yr)
Incandescent strip	4 x 60	600	3,200	5.3	\$17.50
Linear fluorescent	1 x 40	40	3,200	80	\$2.14
CFL wall-mount	2 x 22	44	2,000	45.5	\$3.20

EXAMPLE 3: Hallways

LAMP TYPE	QUANTITY	TOTAL WATT	AV. LUMENS	EFFICACY (lpw)	ENERGY (Cost/Yr)
Incandescent drum	2 x 2 x 60	240	3,200	13.3	\$17.50
CFL drum	2 x 27	54	3,000	55.6	\$7.86
CFL wall-mount	2 x 27	54	3,000	55.6	\$7.86

This is an excessive use of lights but is done in order to maintain the proper “look” of the lighting strip. These type of bulbs may provide a lot of light, but they also produce a lot of shadow. They can be replaced however, by a linear fluorescent of high quality (that can accurately reproduce color tones), or two high-CRI, CFL fixtures flanking the vanity or mirror. Advantages include less glare, more even and shadowless lighting, and less generated heat. The cost calculations for one bathroom in the example above are based on \$0.10 per kWh and 2 hours use per day.

► **HALLWAYS** — Hallways are another high use area that can benefit from the use of efficient light sources. They need to be illuminated at a reasonable level to allow occupants or employees to move between rooms and

negotiate stairs, corners and other potential obstacles. Recessed CFL downlights with diffusers, wall sconces, pendants or surface luminaires are excellent choices for hallway illumination.

Example 3: Energy Saving with High Quality CFL Fixtures in Hallways.

Lighting for hallways is often provided by recessed cans, overhead drums (a light with a surround that is used to spread light more evenly) or surface mounts that use one or more incandescent bulbs for illumination. These incandescent fixtures can be replaced by CFL equivalents overhead or wall mounted fixtures. The cost calculations in the example above, for a long (30 ft) hallway, are based on \$0.10 per kWh and 4 hours use per day.

Selecting the Right Fixture

We have summarized the criteria for selecting energy-efficient, quality luminaires for use in general applications in the table below. We recommend the use of fluorescent fixtures wherever possible because they are the most efficient. The criteria listed below are based on the EPA's ENERGY STAR® Residential Lighting Fixtures specifications. These criteria take into account light quality, system efficacy, ballast starting

characteristics, electrical and fire safety, as well as product longevity. Information on the requirements can be found on packaging and/or product literature.

It should be noted that the ENERGY STAR® Residential Lighting Fixtures program is still new, and some manufacturers may have qualifying products but have not yet signed the agreement with EPA. So where ENERGY STAR® products are available, select from these product lines. Where they are not, use the criteria listed below.

There are about 400 to 500 domestic luminaire manufacturers and an equally large number of overseas manufacturers. A subset (10 -15%) make fluorescent products. Some make a whole line of products, while others specialize in one or two items. Because of the large number of products available as well as, lack of sufficient testing information, the products listed below are intended only to illustrate the range of available energy-efficient products. We have also included a number of efficient portable fixtures in the list on the following pages.

Indoor Luminaire Selection Criteria

CHARACTERISTICS	REQUIREMENTS	BENEFITS
System Efficacy (lpw)	Up to 20 W input power: ≥ 50 lpw 20 to 29 W input power: ≥ 55 lpw ≥ 30 W & < 24 in length: ≥ 60 lpw ≥ 30 W & ≥ 24 in length: ≥ 70 lpw	In general, longer and more powerful lamps are more efficient at converting electricity into light
Convenience	Lamp must continuously illuminate within one second of being switched on.	Eliminates flickering and warm up wait
Light Quality	CRI ≥ 80 for CFLs with diameter $< 3/4$ in CRI ≥ 70 for all others.	Increases user comfort and color perception
Noise	Ballast must have minimum Class A sound rating.	Eliminates buzzing or humming noise problems
Warranty	Repair or replacement of defective part(s) of the fixture (except lamp) within 2 years of the date of purchase.	Increases consumer confidence and satisfaction
Fixture Longevity	Lenses or diffusers should be constructed of glass or UV stable, optical grade plastics and be heat stable. Included reflectors should be UV resistant and heat stable.	Longer lasting products are better for the environment because they reduce waste
Ballast Longevity	Included ballasts must comply with ANSI/IEEE C62.41 (American National Standards Institute/Institute of Electrical and Electronics Engineers) specification for withstanding electrical transients.	Protects products during thunderstorms, wiring mishaps & power surges
Electrical Safety	Fixture must be tested and listed by Underwriters Laboratory (UL), Electrical Testing Lab (ETL), Canadian Standards Association (CSA) or other independent agency. The product should be acceptable for compliance with NFPA (National Fire Protection Association) 70, National Electric Code.	Protects owners and occupants from electrical hazards
Fire Safety	Ballast should have Class P thermal protection. This should be evident on the packaging.	Prevents ballast from overheating.

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Recommended Fluorescent Lighting Products

MFR	MODEL	LAMP W	EST. LUMENS	BLLST	UL	NOTES
Downlighting						
Capri Lighting	Design/Build Series	18, 26 & 36	1,200 - 2,500	E	Yes	Dim (18W)
Con-Tech Lighting	RL Series	13, 18, 26 & 32	1,800 - 3,650	E	Yes	Dim (26 & 32W)
Cooper Lighting	Iris Series with CFLs	32, 42	2,400 - 3,200	E	Yes	*IC-Rated, Dim
Juno Lighting	CFL Downlight Series	18, 26, 32 & 42	1,200 - 3,200	E	Yes	
Kirlin Lighting	Triple Tube CFL Downlights	13, 18, 26, 32 & 42	900 - 3,200	E	Yes	Dim, 3 yrs warr
Nora Lighting	Single, Dual & Horizontal CFL	7, 9, 13 & 26	350 - 1,500	E	Yes	
Ceiling Fixtures						
Capri Lighting	10" Square Rectangular	13, 18, 19 40	1,800 - 3,600 2850	E/H	Yes Yes	2 L, Dim
Enertron Technologies	1000, 1500, 1600, 2000, 7000 & 8000 Series	9, 13, 22, 26 & 39	900 - 2,700	M	Yes	2 L, Energy Star comp.
EUA Nova	Energy Wrap Series	17, 25, 32	900 - 2850	E	Yes	2 L
Halo Lighting	CFL Recessed	21, 26, 28 & 38	NA	E	Yes	Air tight & IC-rated
Juno Lighting	Linear Fluorescent Series	31, 32	2,850 - 2925	E	Yes	2 L
Kichler Lighting	Torchiere Series	40	2,900-3,200	E	Yes	E. Star
Kirlin	Recessed/Surface Squares	13, 18, 26, 32 & 42	900 - 3,200	E	Yes	2 L, Dim, 3 yrs warr
Lights of America	Ceiling Fixtures Series	20, 30	1,500 - 2,400	E	Yes	Energy Star Partner
Metalux	WTS Series	17, 20 (24") 32 (48")	2,400 - 2,500 5,700	E E	Yes Yes	2 L
Power Products	White, maple, oak, acrylic and unfin. frame Series	34, 40	2,400 - 2,900	M	Yes	2 L, Energy Star comp.
Progress Lighting	Linear fluorescent series P358x	36, 39	5,800	H	Yes	2 L, Energy Star comp.
Simkar Lighting	Surface Box & Wraparound	17 (24") 32 (48")	900 2850	E	Yes	Energy Star Partner
Visa Lighting	Ovation/Acrobat Ceiling & Pendant	18, 26, 32, 38 & 42	1,800 - 3,200	E	Yes	2 L, Dim

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Recommended Fluorescent Lighting Products continued

MFR	MODEL	LAMP W	EST. LUMENS	BLLST	UL	NOTES
Wall/Sconces/Bathroom Fixtures						
Cooper Lighting	Surface Series Cylinder Wall	25, 32 26	1925 - 2850 1440	E E	Yes Yes	2 L 2 L
Kirlin Lighting	Surface/Cylinder Rounds Series	13,18, 26, 32 & 42	900 - 3,200	E	Yes	2 L, Dim, 3 yrs warr
Legion Lighting	Wall Bracket & Prismalier Series	34, 46, 58	2,650 - 5,600	E	Yes	Bath/Vanity, E. Star comp.
Thomas Lighting	Bath Lighting Series	20, 30 & 40	1,270 - 2,750	E/H	Yes	2 L
Visa Lighting	Sconces and Acrobat Series	18, 26, 32, 38 & 42	1,800 - 3,200	E	Yes	2 L, Dim
Track/General/Portable						
Adjustable Fixture Co.	Nightingale Series	27	1800	E	Yes	5 yrs warr
AWXCO	S13/S18 Series	13, 18	869 - 1250	E	Yes	
Emess Lighting	Torchiere Series	30	2,350	E	Yes	2 L, E. Star
EFI	Torchiere Series	27	1,800	E	Yes	3 L, E. Star
Juno Lighting	Biax Track Series	18, 39, 40	1,250 - 3,150	E	Yes	2 L,
Kichler Lighting	Torchiere Series	55	4,000	E	Yes	E. Star
Legion Lighting	My-T-Lite Series	19, 24, 32, 42, 46 & 58	1,325 - 5,600	E	Yes	1 L & 2 L E. Star comp.

NOTES AND EXPLANATIONS:

The products above were included based on our judgement of their ability to meet the criteria listed. At a minimum, they meet the lamp efficacy, light quality, starting and noise, safety listing and warranty criteria. Manufacturers of ENERGY STAR® compliant products claim to meet all of the listed criteria.

Lamp W Lamp wattage - Indicates the available lamp wattage(s) for use in a particular luminaire. Note that some fixtures use more than one lamp.

Est. Lumen Estimated lumens - Estimated range of maximum lumens available from included bulb type. Again, note that a number of luminaires use more than one lamp, so the estimated system lumens may be higher.

Bllst Ballast - Indicates the type of ballast used (E = electronic ; H = hybrid; M=magnetic).

UL This product has been reviewed for product safety by Underwriters Laboratory.

Notes "L" indicates the number of bulbs used in fixture. For example, 2 L indicates the fixture utilizes 2 bulbs.

"Dim" indicates that a dimming electronic ballast is available as an option.

"E. Star" indicates that the product is ENERGY STAR® compliant.

"warr." indicates product warranty terms. Unless otherwise noted, all products listed have a warranty of two years.

""** indicates that the product is rated for contact with insulation.

SUCCESS STORY: A BRIGHT IDEA

The Lighting Research Center at Rensselaer Polytechnic Institute carried out an experiment in which they converted the incandescent fixtures in a model town house to use only high-quality, energy-efficient sources where possible. In the living spaces (living rooms, library/study) where portable and owner-installed lighting would normally be used, lighting designers created lighting schemes that incorporated only energy-efficient products.

The researchers also outfitted the house with conventional

lighting designs and products and set up the model home so that these different lighting schemes could be turned on or off. Visitors were asked questions that tested their lighting knowledge and revealed their opinions on the home's lighting scheme.

**ENERGY EFFICIENT
DESIGNS WIN!**

- ✓ **Better Color**
- ✓ **Good Lighting Levels**
- ✓ **Save 25+% electricity**

The majority of visitors overwhelmingly voted for the energy-efficient designs, citing reasons

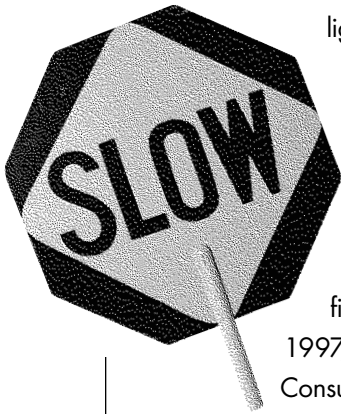
from better color to more pleasant lighting levels. Researchers also estimated that the energy-efficient designs can save 25% to 30% or more in electricity cost under normal use.

SAFETY ALERT

While this report primarily focuses on fixed luminaires, one particular portable luminaire deserves special mention - the halogen torchiere.

These fixtures tend to be used in areas where supplemental lighting is required or where no fixtures are provided for, such as bedrooms, studies, etc., or areas with switched outlets. The halogen bulbs used in these popular and inexpensive luminaires are usually 300 watts, (but can be up to 500 watts), operate at extremely high temperatures, and can be a fire hazard. They have been implicated in a number of fires and fatalities around the country. As of August 1997, they have been the subject of a recall action by the Consumer Product Safety Commission for additional safeguards.

These luminaires are also extremely power hungry, with an annual average operating cost of \$55 or more (at 5 hours per day, \$0.10 per kWh), which is more than 2 or 3 times their initial purchase cost. A number of CFL torchieres have been introduced by manufacturers. Some of these products are, or will, qualify for the ENERGY STAR® label. They are much safer and less expensive to operate, and we therefore recommend their use over halogen torchieres.



FOR MORE INFORMATION ON ENERGY EFFICIENT INDOOR LIGHTING

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Florida Solar Energy Center
University of Central Florida
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407-638-1000

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- **Recommended Fluorescent Lighting Products**

THE ENERGY STAR® RESIDENTIAL LIGHTING FIXTURES PROGRAM

The new ENERGY STAR® Residential Lighting Fixtures Program is designed to introduce to the marketplace high-efficiency, residential fixtures that will reduce overall energy consumption and related carbon dioxide emissions.

ENERGY STAR® compliant fixtures:

- Include both indoor and outdoor, “hardwired”, and portable light fixtures for the home.

- Are “dedicated” fixtures and therefore only operate energy-efficient light sources.

- Meet energy efficiency and quality criteria, assuring customers of energy savings without sacrificing performance.

- Are required to meet reliability and safety performance criteria.

For more information on any of the US EPA's ENERGY STAR® programs, you may

call, toll free at 888-STAR-YES or visit their web site at www.epa.gov/energystar.html.



SAVING THE EARTH. SAVING YOUR MONEY.

Source: EPA